

Customer No.: 31561
Application No.: 10/710,818
Docket No.: 14217-US-PA-X

AMENDMENTS

In The Claims

Claim 1. (currently amended) An electrostatic discharge (ESD) protection device, comprising:

an ESD clamp circuit ESD protection circuit, comprising:
at least a diode connected in series between a first voltage and a pad; and
at least an ESD component connected in series between a second voltage and a pad,
wherein each of the at least an ESD component comprises a deep N-well region formed in a P-type substrate, a triple P-well formed in the deep N-well region, and a highly doped N-type (N+) region and a highly doped P-type (P+) region formed in the triple P-well region.

Claim 2. (original) The ESD protection device of claim 1, wherein when a number of the ESD component is one, the N+ region of the ESD component is connected to the pad, and the P+ region of the ESD component is connected to the second voltage.

Claim 3. (original) The ESD protection device of claim 1, wherein when a number of the ESD component is two including a 1st ESD component and a 2nd ESD component, the N+ region of a 1st ESD component is connected to the pad, the P+ region of the 2nd ESD component is connected to the second voltage, and the P+ region of the 1st ESD component is connected to the N+ region of the 2nd ESD component.

Claim 4. (original) The ESD protection device of claim 1, wherein when a number of the ESD component is S including a 1st ESD component to a Sth ESD component, the N+ region

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of the 1st ESD component is connected to the pad, the P+ region of the Sth ESD component is connected to the second voltage, and the P+ region of the Tth ESD component is connected to the N+ region of the (T+1)th ESD component, wherein S is a positive integer and T is a positive integer from 1 to S-1.

Claim 5. (original) The ESD protection device of claim 1, wherein each of the at least a diode comprises a N-well region formed in a P-type substrate, and a N+ region and a P+ region formed in the N-well region.

Claim 6. (original) The ESD protection device of claim 1, wherein when a number of the diode is one, the N+ region of the diode is connected to the first voltage, and the P+ region of the diode is connected to the pad.

Claim 7. (original) The ESD protection device of claim 1, wherein when a number of the diode is two including a first diode and a second diode, the N+ region of a first diode is connected to the first voltage, the P+ region of the second diode is connected to the pad, and the P+ region of the first diode is connected to the N+ region of the second diode.

Claim 8. (original) The ESD protection device of claim 1, wherein when a number of the diode is S including a 1st diode to a Sth diode, the N+ region of the 1st diode is connected to the first voltage, the P+ region of the Sth diode is connected to the pad, and the P+ region of the Tth diode is connected to the N+ region of the (T+1)th diode, wherein S is a positive integer and T is a positive integer from 1 to S-1.

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Claim 9. (currently amended) The of claim 1, wherein the ESD protection ~~circuit~~ device further comprises another ~~ESD clamp circuit~~ ESD protection circuit comprising:
a PMOS transistor; and
an NMOS transistor, wherein a gate of the PMOS transistor and a gate of the NMOS transistor are connected to the pad, a source of the PMOS transistor is connected to a drain of the NMOS transistor, a drain of the PMOS transistor is connected to the first voltage, and a source of the NMOS transistor is connected to the second voltage.

Claim 10. (original) The ESD protection device of claim 1, wherein the ESD protection device is a radio frequency (RF) ESD protection device.

Claim 11. (currently amended) An electrostatic discharge (ESD) protection device, comprising:
~~an ESD clamp circuit~~ ESD protection circuit, comprising:
at least a first ESD component connected in series between a first voltage and a pad; and
at least a second ESD component connected in series between a second voltage and a pad, wherein each of the at least a first ESD component or the at least a first ESD component comprises a deep N-well region formed in a P-type substrate, a triple P-well formed in the deep N-well region, and a highly doped N-type (N+) region and a highly doped P-type (P+) region formed in the triple P-well region.

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Claim 12. (original) The ESD protection device of claim 11, wherein when a number of the first ESD component is one, the N+ region of the first ESD component is connected to the pad, and the P+ region of the first ESD component is connected to the second voltage.

Claim 13. (original) The ESD protection device of claim 11, wherein when a number of the first ESD component is two including a 1st first ESD component and a 2nd first ESD component, the N+ region of a 1st first ESD component is connected to the pad, the P+ region of the 2nd first ESD component is connected to the second voltage, and the P+ region of the 1st first ESD component is connected to the N+ region of the 2nd first ESD component.

Claim 14. (original) The ESD protection device of claim 11, wherein when a number of the first ESD component is S including a 1st first ESD component to a Sth first ESD component, the N+ region of the 1st first ESD component is connected to the pad, the P+ region of the Sth first ESD component is connected to the second voltage, and the P+ region of the Tth first ESD component is connected to the N+ region of the (T+1)th first ESD component, wherein S is a positive integer and T is a positive integer from 1 to S-1.

Claim 15. (original) The ESD protection device of claim 11, wherein when a number of the second ESD component is one, the N+ region of the second ESD component is connected to the first voltage, and the P+ region of the second ESD component is connected to the pad.

Claim 16. (original) The ESD protection device of claim 11, wherein when a number of the second ESD component is two including a 1st second ESD component and a 2nd second ESD component, the N+ region of a 1st second ESD component is connected to the first voltage,

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the P+ region of the 2nd second ESD component is connected to the pad, and the P+ region of the 1st second ESD component is connected to the N+ region of the 2nd second ESD component.

Claim 17. (original) The ESD protection device of claim 11, wherein when a number of the second ESD component is S including a 1st second ESD component to a Sth second ESD component, the N+ region of the 1st second ESD component is connected to the first voltage, the P+ region of the Sth second ESD component is connected to the pad, and the P+ region of the Tth second ESD component is connected to the N+ region of the (T+1)th second ESD component, wherein S is a positive integer and T is a positive integer from 1 to S-1.

Claim 18. (original) The ESD protection device of claim 11, wherein the ESD protection device is a radio frequency (RF) ESD protection device.

Claim 19. (currently amended) The ESD protection device of claim 11, wherein the ESD protection circuit device further comprises another ESD clamp circuit ESD protection circuit comprising:

a PMOS transistor; and
an NMOS transistor, wherein a gate of the PMOS transistor and a gate of the NMOS transistor are connected to the pad, a source of the PMOS transistor is connected to a drain of the NMOS transistor, a drain of the PMOS transistor is connected to the first voltage, and a source of the NMOS transistor is connected to the second voltage.